

Appl. No. 10/650,210
Reply to Office Action of June 10, 2005

IN THE CLAIMS

Please enter the following amended set of claims:

1. (Currently Amended) An apparatus for providing climate cooling to the passenger cabin of a motor vehicle, comprising:
 - an internal combustion engine capable of being started and temporarily stopped;
 - an air conditioning compressor;
 - a compressor motor coupled to said air conditioning compressor via a back mechanical coupler, said motor being controllable to operate said compressor;
 - sensors coupled to monitor selected parameters associated with said motor vehicle;
 - an electronic controller coupled to said internal combustion engine, said compressor motor and said sensors, said controller being configured to:
 - selectively start and temporarily stop the operation of said engine; and
 - respond to said selected parameters to selectively operate said compressor motor and to selectively engage said back mechanical coupler to thereby operate said compressor when said engine is temporarily stopped so that the climate cooling continues to be supplied to the passenger cabin.
2. (Currently Amended) The apparatus of claim 1 further including:
 - a front mechanical coupler for selectively coupling said compressor to said engine; and
 - said electric controller selectively operating said front mechanical coupler to couple said compressor to said engine when said engine is running and to de-couple said compressor from said engine when said engine is temporarily stopped.
3. (Currently Amended) The apparatus of claim 1 further including a compressor motor control system for selectively activating and deactivating said compressor motor and for selectively engaging and disengaging said back mechanical coupler.

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4. (Original) The apparatus of claim 3 wherein said compressor motor control system includes:

a battery; and
a controllable switch coupled between said battery and said electronic controller; and
said electronic controller operating said switch to selectively supply electrical power from said battery to said compressor motor.

5. (Original) The apparatus of claim 4 wherein one of said sensors monitors the state of charge of said battery.

6. (Currently Amended) The apparatus of claim 1 further including:
~~a mechanical coupler coupled between said compressor motor and said compressor; and~~
said back mechanical coupler automatically coupling said motor to said compressor to operate said compressor when said compressor motor is activated and for automatically decoupling said motor from said compressor when said motor is deactivated.

7. (Original) The apparatus of claim 1 wherein some of said sensors monitor inputs controlled by a user of the motor vehicle.

8. (Original) The apparatus of claim 7 wherein said some of said sensors monitor accelerator pedal positions, brake pedal positions and cooling control positions.

9. (Original) The apparatus of claim 1 wherein one of said sensors monitors the ambient temperature of the vehicle.

10. (Original) The apparatus of claim 1 wherein one of said sensors monitors the revolutions per minute of the engine.

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11. (Currently Amended) A method for providing climate cooling to the passenger cabin of a motor vehicle having an internal combustion engine that is selectively started and temporarily stopped, such method comprising the steps of:

sensing selected parameters associated with said motor vehicle; ~~and~~

responding to one or more of said selected parameters to selectively engage a front mechanical coupler to drive a compressor with said engine when said engine is operating above a minimum RPM; and

responding to one or more of said selected parameters to selectively engage a back mechanical coupler to drive said compressor with ~~operate~~ a compressor motor ~~to thereby operate a compressor~~ when said engine is temporarily stopped so that the climate cooling continues to be supplied to the passenger cabin while the engine is temporarily stopped.

12. (Currently Amended) The method of claim 11 further comprising the steps of:

sensing whether cabin cooling is being requested;

if cabin cooling is requested then calculating a period for the engine to directly operate the compressor via said front mechanical coupler;

utilizing the engine to operate said compressor via said front mechanical coupler for said time period to cool the cabin temperature during said time period; and

providing a first control signal when said time period has elapsed, said first control signal allowing the engine to be temporarily stopped and the compressor motor to be operated via said back mechanical coupler so that the compressor can provide additional cabin cooling when said engine is temporarily stopped.

13. (Original) The method of claim 12 further including the steps of:

sensing the vehicle ambient temperature;

sensing the vehicle ambient humidity; and

calculating said period by utilizing at least the vehicle ambient temperature and humidity.

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14. (Original) The method of claim 12 further including the steps of:
sensing vehicle associated diagnostics parameters;
determining whether said diagnostic parameters are within acceptable limits; and
providing said first control signal only if said diagnostic parameters are within acceptable limits.

15. (Original) The method of claim 14 wherein said diagnostic parameters include the state of the charge of a battery for powering the compressor motor.

16. (Original) The method of claim 12 including the further steps of:
sensing when an engine stop is commanded;
monitoring the engine revolutions per minute as the engine is stopping;
providing a second control signal when the engine revolutions per minute fall below a predetermined threshold; and
utilizing said second control signal to activate said compressor electric motor.

17. (Currently Amended) ~~The method of claim 16 further including the further steps of~~
A method for providing climate cooling to the passenger cabin of a motor vehicle having an internal combustion engine that is selectively started and temporarily stopped, such method comprising the steps of:

sensing selected parameters associated with said motor vehicle;
responding to said selected parameters to selectively operate a compressor motor to thereby operate a compressor when said engine is temporarily stopped so that the climate cooling continues to be supplied to the passenger cabin while the engine is temporarily stopped;
sensing whether cabin cooling is being requested;
if cabin cooling is requested then calculating a period for the engine to directly operate the compressor;
utilizing the engine to operate said compressor for said time period to cool the cabin temperature during said time period;

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providing a first control signal when said time period has elapsed, said first control signal allowing the engine to be temporarily stopped and the compressor motor to be operated so that the compressor can provide additional cabin cooling when said engine is temporarily stopped;

sensing when an engine stop is commanded;

monitoring the engine revolutions per minute as the engine is stopping;

providing a second control signal when the engine revolutions per minute fall below a predetermined threshold;

utilizing said second control signal to activate said compressor electric motor;

sensing diagnostics parameters associated with the vehicle;

determining whether said diagnostic parameters are within acceptable limits; and

providing said second control signal only if said diagnostic parameters are within acceptable limits.

18. (Original) The method of claim 17 wherein said engine is restarted if said diagnostic parameters are not within said acceptable limits.

19. (Original) The method of claim 17 wherein said diagnostic parameters include hybrid system fault codes.

20. (Original) The method of claim 16 further including the steps of:
monitoring whether an engine restart is commanded;
terminating the operation of said compressor motor in response to said engine restart command;
restarting said engine in response to said engine restart command; and
utilizing said engine to operate said compressor.